FORM PTO-1390 (REV. 5-93) U S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: ASA-101

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5): 09/623008

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/IB99/01651	08 October 1999	20 November 1998

TITLE OF INVENTION

METHOD OF TREATMENT OF GOODS WITH CARBON DIOXIDE AND NITROGEN

APPLICANT(S) FOR DO/EO/US

Carlos Ernesto KOSTER

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ■ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. □ This is a **SECOND OR SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ■ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ■ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ■ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. □ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ■ has been transmitted by the International Bureau.
   c. □ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ■ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ■ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. □ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. □ have been transmitted by the International Bureau.
   c. □ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ■ have not been made and will not be made.
8. □ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ■ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). (executed, attached to a copy of the International Application)
10. □ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. □ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. □ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ■ A FIRST preliminary amendment.
    □ A SECOND or SUBSEQUENT preliminary amendment.
14. ■ A substitute specification. (attached to a red-ink marked-up version of the English language translation)
15. □ A change of power of attorney and/or address letter.
16. ■ Other items or information:
    - Form PCT/IB/301
    - Form PCT/IB/308
    - Form PCT/ISA/210 (English language version, 3 pages)
    - Transmittal of Substitute Specification
    - Executed Petition To Revive An Application For Patent Abandoned Unintentionally Under 37 C.F.R. 1.137(b) together with a check in the amount of $605.00 in payment of the Petition fee
    - Executed Authorization Of Attorney(s) To Accept And Follow Instructions From Representative
    - Certificate of Mailing by Express Mail (2 pages)
    - Executed Claim for Small Entity Status document
    - Return Receipt Postcard

EXPRESS MAIL NO.: EL631370381US
MAILED: 24 August 2000

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/623008	PCT/IB99/01651	ASA-101

17. ■ The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):

		CALCULATIONS PTO USE ONLY
Search Report has been prepared by the EPO or JPO	$ 840.00	
International preliminary examination fee paid to USPTO (37 CFR 1.482)	$ 670.00	
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))	$ 690.00	
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO	$ 970.00	
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)	$ 96.00	

ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 840.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ❑ 20 ❑ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).		

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	5* - 20 =		X $18.00		
Independent claims	1* - 03 =		X $78.00		
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $260.00		
TOTAL OF ABOVE CALCULATIONS =				$ 840.00	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).				$ 420.00	
SUBTOTAL =				$ 420.00	
Processing fee of **$130.00** for furnishing the English translation later than ❑ 20 ❑ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +					
TOTAL NATIONAL FEE =				$ 420.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +					
TOTAL FEES ENCLOSED =				$ 420.00	
				Amount to be: refunded	$
				charged	$

* Based upon entry of the First Preliminary Amendment.

a. ■ A check in the amount of $ 420.00 to cover the above fee is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ■ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 19-3550. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

Mark E. Fejer
SIGNATURE

Mark E. Fejer
NAME

34,817
REGISTRATION NUMBER

SEND ALL CORRESPONDENCE TO:

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VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(b))--INDEPENDENT INVENTOR	Docket Number (Optional) ASA-101

Applicant or Patentee: Carlos Ernesto KOSTER

Serial or Patent No.: _____

Filed or Issued: _____

Title: METHOD OF TREATMENT OF GOODS WITH CARBON DIOXIDE AND NITROGEN

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- [X] the specification filed herewith with title as listed above.
- [ ] the application identified above.
- [ ] the patent identified above.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- [X] No such person, concern, or organization exists.
- [ ] Each such person, concern or organization is listed below.

Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Carlos Ernesto KOSTER	NULL	NULL.
NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
Signature of inventor	Signature of inventor	Signature of inventor
Date: 8/18/2000	Date	Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Carlos Ernesto KOSTER

Title: METHOD OF TREATMENT OF GOODS WITH CARBON DIOXIDE AND NITROGEN

Based Upon: PCT/IB99/01651

Express Mail No.: EL631370381US

Date of Deposit: 24 August 2000

FIRST PRELIMINARY AMENDMENT

Box PCT
Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Please amend the subject application as follows to place this application in better condition for examination:

In the claims:

[CLAIMS

Having described and determined the nature of the herein utility model and the way this one is to be carried out to practice, it is hereby declared what it is recovered in as invention and of exclusive property:]

I CLAIM:

Based Upon: PCT/IB99/01651

1. (Amended) [Method] A method for the treatment of goods with carbon dioxide and nitrogen comprising: generating said carbon dioxide and nitrogen at a location of said goods by washing, filtering, cooling and catalysing of other gas sources.

[characterised because the generation of the gases before mentioned occurs in the same place where used. Such is the case of: vessels, plants where cereals are stored, oil extraction plants and other storage places, obtaining the gases through the washing, filtering, cooling and catalysing of other gases.]

2. (Amended) [Method] A method for the treatment of goods with carbon dioxide and nitrogen according to claim 1[)], wherein said location of said goods is selected from the group consisting of transportation vessels, plants where said goods are stored, oil extraction plants, silos and other storage sites.

[characterised because in the case of the vessels, the gas source of the carbon dioxide and the nitrogen shall be obtained from the ship's chimney.]

3. (Amended) [Method] A method for the treatment of goods with carbon dioxide and nitrogen according to claim 2[1)], [characterised because in the case of the] wherein said goods are located in oil extraction plants[,] and the gas source of the carbon dioxide and nitrogen [shall be] is obtained from [the giving off] an exhaust from [the boilers] at least one boiler in the [above mentioned presented] oil extraction plants.

4. (Amended) [Method] A method for the treatment of goods with carbon dioxide and nitrogen according to claim 2[1)], [characterised because in the case of the silo plants that do not present any type of combustion engine where to obtain the gases from, they shall be] wherein said goods are located in silos and said carbon dioxide and nitrogen are obtained from [the] mobile carbon dioxide and nitrogen generators[. These ones work by extracting the] which extract oxygen from said silos and [injecting] inject the carbon dioxide and nitrogen [in the storage place] into said silos, until [they manage to perform a] removal of [the] about 98% of the [first gas] oxygen is achieved.

Please add the following new claim:

5. A method for the treatment of goods with carbon dioxide and nitrogen according to claim 2, wherein said goods are located in a ship and the gas source of the carbon dioxide and nitrogen is a stack of said ship.

On a separate page, please add the following: **ABSTRACT OF THE DISCLOSURE**.

Based Upon: PCT/IB99/01651

--ABSTRACT OF THE DISCLOSURE

Method for the treatment of goods with carbon dioxide and nitrogen at the site where the goods are stored. Carbon dioxide and nitrogen gas sources available at the sites are treated to obtain the carbon dioxide and nitrogen, such as by separation from engine combustion products in the case where the goods are located on a ship.--

Based Upon: PCT/IB99/01651

REMARKS

Applicant respectfully requests entry of the above Preliminary Amendment to place this patent application in better form for examination and prosecution before the U.S. Patent and Trademark Office.

The claims have been amended to more definitely and fully claim the subject matter of Applicant's invention. Applicant urges that the above Preliminary Amendment introduces no new matter into this patent application.

Applicant sincerely believes that this patent application is now in condition for examination and prosecution before the U.S. Patent and Trademark Office.

Respectfully submitted,

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Based Upon: PCT/IB99/01651

SUBSTITUTE SPECIFICATION

Based Upon: PCT/IB99/01651

METHOD FOR THE TREATMENT OF GOODS WITH CARBON DIOXIDE AND NITROGEN

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to a method for the treatment of goods with carbon dioxide and nitrogen. More particularly, the method of this invention involves removing all of the pesticides from fumigation and replacing them with carbon dioxide and nitrogen wherein the carbon dioxide and nitrogen are generated in the same place where the goods are to be stored. This may be during transportation of the goods in ships or in storage plants. Due to its low cost and to the fact that the gases are considered organic, an additional value is provided to cereals, grains and subproducts.

Description of Prior Art

Requirements to use lower quantities of pesticides on goods bound for human and animal consumption have been increasing in the past few years. However, such goods are not accepted due to deterioration by insects, mushrooms, parted grains, etc.

In the storage of large quantities of cereals and subproducts, there are significant problems such as increasing of temperatures, fermentation, insects attacks, proliferation of mushrooms, etc. The temperature increase is due to the pressure and

humidity, thereby increasing the risk of fire. On the other hand, mushrooms have been major problems for goods over the past few years, due to the fact that the presence of mycotoxins can cause the goods to have to be discarded.

Presently, to fight against such problems, techniques such as movement of the goods, ventilation and fumigation with pesticides are being used. However, such techniques generate some inconveniences because the movement causes the parting of the grains, with a subsequent loss of quality and conventional fumigations, apart from having a high cost, are being eliminated due to new ecological concerns. In addition, in countries such as Germany and Holland it is difficult to carry out fumigation due to the fact that both silos and mills are located in urban areas. This is why the government doesn't allow the use of some of the fumigant gases such as phosphamine (aluminium phosphide), methyl bromide and others. Consequently, it is even more difficult to maintain the goods healthy and without insects.

SUMMARY OF THE INVENTION

Carbon dioxide is a common gas in the atmosphere and, thus, it is not considered toxic. Using this gas, all of the problems discussed above are solved, because eliminating all of the oxygen from a room and replacing it with carbon dioxide or nitrogen results in elimination of all the insects and aerobic mushrooms. In addition, because there is no oxygen, the oxidation that occurs in the goods and

generates an increase of the temperature or rancidness is prevented. Such is the case with oleaginous goods.

Up to the present, no one has found a way to generate carbon dioxide in place. The ways to carry out the fumigation with this gas used to involve carrying cylinders of 6 to 10 cubic metres of gas to the place where the goods were located. Generally, the quantities of the goods to be treated are high making it necessary to carry a lot of cyclinders. Because these cyclinders are very heavy (110 – 140 kilograms each), the task is difficult and costs are very high. This is why this type of treatment has not been used. In addition, it was not competitive with pesticides. As an example, in silos of 20000 tons, with a size of approximately 26000 cubic meters, the amount of gas required to remove the oxygen is at least 11700 cubic meters (minimum 45% of the total size). The quantity of cyclinders to be used would be 1170, having a total weight of 163800 kilograms. Only the necessary labor for such a task has a higher cost than the fumigation with any pesticide.

We have discovered a method for generating carbon dioxide and nitrogen in the place where the goods are located at a competitive cost. The method of this invention depends principally on the place where the goods are located.

DESCRIPTION OF PREFERRED EMBODIMENTS

Example 1

To carry out the method of this invention inside the holds of the vessels in accordance with one embodiment of this invention, the gases that are emitted from the steamer engines' exhaust chimneys are used. These gases comprise carbon dioxide, nitrogen, carbon monoxide and other gases coming from the engine combustion. The quantity of gases that these engines produce is substantially greater than what is necessary to fumigate all of the holds of the vessel. Therefore, it is desirable to separate out the desired gases. To separate the carbon dioxide and nitrogen, the gases coming from the exhaust are washed, filtered, cooled and catalysed. The separated carbon dioxide and nitrogen are then transmitted to the holds to be fumigated. With some easy calculations, the amount of time required for the process can be readily determined. Thereafter, the device is disconnected and the goods are completely protected.

Example 2

In the case of oil extraction plants, all of them have boilers. Presently, all of the gases they produce are emitted to the atmosphere. Performing the same treatment above mentioned, we can obtain from those gases the carbon dioxide and the nitrogen we are interested in for carrying out the treatment to the stored goods.

Example 3

In the case of silo plants, there are no boilers or engines from which to obtain the gases. In this case, mobile carbon dioxide and nitrogen generators are used, which use the same air from inside the silo, consuming more than 98% of the oxygen. In this case, through a pipe located in the upper part of the silo, the air contained inside the silo is transmitted to the generator. Once the carbon dioxide and the nitrogen are generated, they are transmitted back to the silo through another pipe. This will start the air moving upwards, as a result of which after a certain amount of time, all the air contained inside the silo will go through the generator and all the carbon dioxide and nitrogen will be generated so as to saturate the atmosphere inside the silo. Once this point has been reached, the generator can be stopped, since, to maintain the combustion that generates the carbon dioxide and nitrogen, oxygen which is taken from inside the silo is needed.

With the examples above mentioned, we have shown the different ways to carry out the conditioning of the goods in accordance with the method of this invention in a way which is totally free of pesticides and fungicides, together with a cost highly competitive with conventional fumigation and treatment with fungicides. All this is looked for all around the world to reduce the quantity of chemical residues that remain in the goods which are bound to human consumption and which come from fumigation done in a conventional way.

METHOD FOR THE TREATMENT OF GOODS WITH CARBON DIOXIDE AND NITROGEN

BACKGROUND OF THE INVENTION

Field of the Invention

This invention, whose registration is applied for, in compliance with the different requirements from the Law, consists of a treatment of goods with carbon dioxide and nitrogen.

More particularly, the present invention relates to a method for the treatment of goods with carbon dioxide and nitrogen and is characterised and distinguished for removing all of the pesticides from fumigation, and replacing them with carbonic gas and nitrogen, due to the ability to generate carbon dioxide and nitrogen in the same place where the goods are to be stored. This may be whether during its transportation in ships or in the storage plants, due to its low cost and to the fact that the gases are considered organic as an additional value it grants to the cereals, grains and subproducts.

Exigencies about using less quantity of pesticides for the goods bound to human and animal consumption have been increasing in the last years. However, such goods are not accepted to be deteriorated by insects, mushrooms, parted grains, etc.

In the storage of big quantities of cereals and subproducts, we can find big inconvenience such as: increasing of temperatures, fermentation, insects attacks, proliferation of mushrooms, etc. The temperature increase is due to the pressure and to humidity, increasing with it the risk of fire. On the other hand, the mushrooms are the big enemies of the goods from the last years, due to the fact that the presence of mycotoxins can cause them to be discarded.

Presently, to fight against such problems, techniques like movement of the goods, ventilation and fumigation with pesticides are being used. Such actions generate some inconveniences, since the movement causes the parting of the grains, with the subsequent lose of quality and the conventional fumigations, apart from having a high cost, are attempting to be eliminated due to the

new ecologist tendency. To this we must add that countries such as Germany and Holland have big difficulties to carry out fumigation due to the fact that both silos and mills are located in urban areas. This is why the government doesn't allow the use of some of the fumigant gases such as: phosphamine (aluminium phosphide), methyl bromide and others. With this it is even more difficult to maintain the goods healthy and without insects.

The carbon dioxide is a common gas from the atmosphere, therefore it is not considered toxic. Using this gas, all of the difficulties above presented are solved, since eliminating from a room the totality of the oxygen and replacing it for carbon dioxide or nitrogen, all the insects and aerobic mushrooms are eliminated too. Besides, since there is no oxygen, a lot of oxidation that appears in the goods and generates an increase of the temperature or rancidness, is prevented. Such is the case of the oleaginous.

Up to the present, no one had ever found the way to generate the carbon dioxide in the place. Besides the ways to carry out the fumigation with this gas used to be carrying cylinders of 6 to 10 cubic metres of gas as far as the place where the good was located. Generally, the sizes of the goods to be treated are high this was the reason why it was necessary to carry a lot of tubes. Since these tubes are very heavy (110 – 140 kilograms each), the task turned to be troublesome and costs very high, that is the reason why this type of treatment were not used to be done, since it was not competitive with the pesticides. As an example we can bring forward that in the silos of 20000 tons, with a size of approximately 26000 cubic meters, the gas to be applied to remove the oxygen is at least 11700 cubic meters (minimum 45% of the total size). The quantity of tubes to be used would be 1170, with a total weight of 163800 kilograms. Only the necessary labour to such a task had a higher cost than the fumigation with any pesticide.

Nowadays, thanks to the investigations carried out we have found the way to generate carbon dioxide and nitrogen in the place where the goods are located at a really competitive cost. The way to carry it out depends principally on the place where they are located, hereby presenting different cases.

DESCRIPTION OF PREFERRED EMBODIMENTS

Example 1

1) To carry out the treatment inside the holds of the vessels, we will make use of the gases that are given off from the steamer engines' exhaust chimneys. A mixture of the different gases among which we can find: carbon dioxide, nitrogen, carbon monoxide and other gases coming from the engine combustion, are given off from the chimney. The quantity of gas that these engines produce, widely overpasses what is necessary to fumigate all of the holds of the vessel, therefore what we will do is a depuration of the gases so as to get the ones that we really need. To obtain carbon dioxide and nitrogen, we will make the following treatment to the gases coming from the exhaust: washing, filtering, cooling and catalysing. With this, we manage to separate the gases that we are really interested in, to later send them to the holds we want to fumigate. With some easy calculations, we will know how long it must be working. Therefore, after that time the device will be disconnected and the goods shall be completely protected.

Example 2

2) In the case of oil extraction plants, all of them have boilers. Up to the moment all of the gases they give off are freed to the atmosphere. Performing the same treatment above mentioned, we can obtain from those gases the carbon dioxide and the nitrogen we are interested in to carry out the treatment to the stored goods.

Example 3

3) For the case of silo plants, there are no boilers or engines where to obtain the gases above mentioned from. Obtaining them can be done through the use of mobile carbon dioxide and

nitrogen generators, which use the same air from inside the silo up to consuming more than 98% of the oxygen. In this case the generators work in the following way: through a pipe located in the upper part of the silo, the air contained inside this one is leaded up to the generator of the gas we are looking for. Once the carbon dioxide and the nitrogen are generated, they are leaded as far as the silo through another pipe. These ones will start moving the air upwards, with which in a certain moment all the air contained inside the silo will go through the generator and all the carbon dioxide an nitrogen will be generated as to saturate the atmosphere inside the silo. Once this point has been reached, the generator will stop working, since, to maintain the flame that generates the carbon dioxide and nitrogen burning, oxygen is needed and it is taken from the air that is located inside the silo.

With the examples above mentioned, we hereby show the different ways to carry out the conditioning of the goods in a way which is totally free of pesticides and fungicides, together with a cost highly competitive with the conventional fumigation and the treatment with fungicides. All this is looked for all around the world to reduce the quantity of chemical residues that remain in the goods which are bound to human consumption and which come from the fumigation done in a conventional way.

It is because of the benefits that this treatment produce, that we want to register the utility model to use the carbon dioxide and the nitrogen in the goods that are bound to human and/or animal consumption in the aforementioned ways.

SUMMARY

Method for the treatment of goods with carbon dioxide and nitrogen in the place where there are grains, cereals and subproducts stored. The way to do it, depends principally on the place where they are located, here in presenting different cases:

1) To carry out the treatment in the holds of the vessels, we shall get the carbon dioxide and nitrogen from the gases coming from the engine combustion and later given off through the chimneys. We shall perform to those gases the following treatment: washing, filtering, cooling and catalysing; with that, we shall select the gases to later send them to the holds we would like to treat.
2) In the case of oil extraction plants, all of them have boilers. Performing the same treatment above mentioned we will be able to obtain from those gases the carbon dioxide and the nitrogen to carry out the treatment of the stored goods.
3) For the case of the silo plants, their obtention can be carried out through the use of the mobile carbon dioxide and nitrogen generators. In this case the generators work in the following way: through a pipe located in the upper part of the silo, the air contained inside the silo is leaded as far as the generator of the gas we are searching. Once both the carbon dioxide and the nitrogen are generated, these ones are leaded until the silo through another pipe.

METHOD FOR THE TRATMENT OF GOODS WITH CARBON DIOXIDE AND NITROGEN.

The herein invention, whose registration is applied for, in compliance with the different requirements from the Law, consists of a treatment of goods with carbon dioxide and nitrogen. Such method is characterised and distinguished for removing all of the pesticides in fumigation, replacing them for carbonic gas and nitrogen, due to the ability to generate carbon dioxide and nitrogen in the same place where the goods are to be stored. This can be whether during its transportation in ships or in the storage plants, due to its low cost and to the fact that they are considered organic as an additional value it grants to the cereals, grains and subproducts.

Exigencies about using less quantity of pesticides for the goods bound to human and animal consumption have been increasing in the last years. However, such goods are not accepted to be deteriorated by insects, mushrooms, parted grains, etc.

In the storage of big quantities of cereals and subproducts, we can find big inconvenience such as: increasing of temperatures, fermentation, insects attacks, proliferation of mushrooms, etc. The temperature increase is due to the pressure and to humidity, increasing with it the risk of fire. On the other hand, the mushrooms are the big enemies of the goods from the last years, due to the fact that the presence of mycotoxins can cause them to be discarded.

Presently, to fight against such problems, techniques like movement of the goods, ventilation and fumigation with pesticides are being used. Such actions, generate some inconveniences, since the movement causes the parting of the grains, with the subsequent lose of quality and the conventional fumigations apart from having a high cost are attempting to be eliminated due to the

new ecologist tendency. To this we must add that countries such as Germany and Holland have big difficulties to carry out fumigation due to the fact that both silos and mills are located in urban areas. This is why the government doesn't allow the use of some of the fumigant gases such as: phosphamine (aluminium phosphide), methyl bromide and others. With this it is even more difficult to maintain the goods healthy and without insects.

The carbon dioxide is a common gas from the atmosphere, therefore it is not considered toxic. Using this gas all of the difficulties above presented are solved, since eliminating from a room the totality of the oxygen and replacing it for carbon dioxide or nitrogen, all the insects and aerobic mushrooms are eliminated too. Besides, since there is no oxygen, a lot of oxidation that appears in the goods and generates an increase of the temperature or rancidness, is prevented. Such is the case of the oleaginous.

Up to the present, no one had ever found the way to generate the carbon dioxide in the place. Besides the ways to carry out the fumigation with this gas used to be carrying cylinders of 6 to 10 cubic metres of gas as far as the place where the good was located. Generally, the sizes of the goods to be treated are high this was the reason why it was necessary to carry a lot of tubes. Since these tubes are very heavy (110 – 140 kilograms each), the task turned to be troublesome and costs very high, that is the reason why this type of treatment were not used to be done, since it was not competitive with the pesticides. As an example we can bring forward that in the silos of 20000 tons, with a size of approximately 26000 cubic meters, the gas to be applied to remove the oxygen is at least 11700 cubic meters (minimum 45% of the total size). The quantity of tubes to be used would be 1170, with a total weight of 163800 kilograms. Only the necessary labour to such a task had a higher cost than the fumigation with any pesticide.

Nowadays, thanks to the investigations carried out we have found the way to generate carbon dioxide and nitrogen in the place where the goods are located at a really competitive cost. The way to carry it out depends principally on the place where they are located, hereby presenting different cases.

1) To carry out the treatment inside the holds of the vessels, we will make use of the gases that are given off from the steamer engines´ exhaust chimneys. A mixture of the different gases among which we can find: carbon dioxide, nitrogen, carbon monoxide and other gases coming from the engine combustion, are given off from the chimney. The quantity of gas that these engines produce, widely overpasses what is necessary to fumigate all of the holds of the vessel, therefore what we will do is a depuration of the gases so as to get the ones that we really need. To obtain carbon dioxide and nitrogen, we will make the following treatment to the gases coming from the exhaust: washing, filtering, cooling and catalysing. With this, we manage to separate the gases that we are really interested in, to later send them to the holds we want to fumigate. With some easy calculations, we will know how long it must be working. Therefore, after that time the device will be disconnected and the goods shall be completely protected.
2) In the case of oil extraction plants, all of them have boilers. Up to the moment all of the gases they give off are freed to the atmosphere. Performing the same treatment above mentioned, we can obtain from those gases the carbon dioxide and the nitrogen we are interested in to carry out the treatment to the stored goods.
3) For the case of silo plants, there are no boilers or engines where to obtain the gases above mentioned from. Obtaining them can be done through the use of mobile carbon dioxide and

nitrogen generators, which use the same air from inside the silo up to consuming more than 98% of the oxygen. In this case the generators work in the following way: through a pipe located in the upper part of the silo, the air contained inside this one is leaded up to the generator of the gas we are looking for. Once the carbon dioxide and the nitrogen are generated, they are leaded as far as the silo through another pipe. These ones will start moving the air upwards, with which in a certain moment all the air contained inside the silo, will go through the generator and all the carbon dioxide an nitrogen will be generated as to saturate the atmosphere inside the silo. Once this point has been reached, the generator will stop working, since to maintain the flame that generates the carbon dioxide and nitrogen burning, oxygen is needed and it is taken from the air that is located inside the silo.

With the examples above mentioned, we hereby show the different ways to carry out the conditioning of the goods in a way which is totally free of pesticides and fungicides, together with a cost highly competitive with the conventional fumigation and the treatment with fungicides. All this is looked for all around the world to reduce the quantity of chemical residues that remain in the goods which are bound to human consumption and which come from the fumigation done in a conventional way.

It is because of the benefits that this treatment produce, that we want to register the utility model to use the carbon dioxide and the nitrogen in the goods that are bound to human and/or animal consumption in the aforementioned ways.

CLAIMS

Having described and determined the nature of the herein utility model and the way this one is to be carried out to practice, it is hereby declared what it is recovered in as invention and of exclusive property:

1) Method for the treatment of goods with carbon dioxide and nitrogen characterised because the generation of the gases before mentioned occurs in the same place where used. Such is the case of: vessels, plants where cereals are stored, oil extraction plants and other storage places, obtaining the gases through the washing, filtering, cooling and catalysing of other gases.

2) Method for the treatment of goods with carbon dioxide and nitrogen according to claim 1), characterised because in the case of the vessels, the gas source of the carbon dioxide and the nitrogen shall be obtained from the ship´s chimney.

3) Method for the treatment of goods with carbon dioxide and nitrogen according to claim 1), characterised because in the case of the oil extraction plants, the gas source of the carbon dioxide and nitrogen shall be obtained from the giving off from the boilers in the above mentioned presented plants.

4) Method for the treatment of goods with carbon dioxide and nitrogen according to claim 1), characterised because in the case of the silo plants that do not present any type of combustion engine where to obtain the gases from, they shall be obtained from the mobile carbon dioxide and nitrogen generators. These ones work by extracting the oxygen and injecting the carbon dioxide and nitrogen in the storage place, until they manage to perform a removal of the 98% of the first gas.

SUMMARY

Method for the treatment of goods with carbon dioxide and nitrogen in the place where there are grains, cereals and subproducts stored. The way to do it, depends principally on the place where they are located, here in presenting different cases:

1) To carry out the treatment in the holds of the vessels, we shall get the carbon dioxide and nitrogen from the gases coming from the engine combustion and later given off through the chimneys. We shall perform to those gases the following treatment: washing, filtering, cooling and catalysing; with that, we shall select the gases to later send them to the holds we would like to treat.
2) In the case of oil extraction plants, all of them have boilers. Performing the same treatment above mentioned we will be able to obtain from those gases the carbon dioxide and the nitrogen to carry out the treatment of the stored goods.
3) For the case of the silo plants, their obtention can be carried out through the use of the mobile carbon dioxide and nitrogen generators. In this case the generators work in the following way: through a pipe located in the upper part of the silo, the air contained inside the silo is leaded as far as the generator of the gas we are searching. Once both the carbon dioxide and the nitrogen are generated, these ones are leaded until the silo through another pipe.

PTO/SB/108 (6-96)
Approved for use through 9/30/01. OMB 0651-0032
Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Declaration and Power of Attorney for Patent Application

Declaración y poder para solicitud de patente

Spanish Language Declaration

Como inventor abajo nombrado, por este medio declaro que:

As a below named inventor, I hereby declare that:

Mi residencia, dirección postal y ciudadanía son los que indican a continuación, al lado de mi nombre.

My residence, post office address and citizenship are as stated next to my name.

Considero que soy el primer, original y único inventor (si hay un solo nombre indicado a continuación) o el primer, original y único inventor conjunto (en caso de múltiples nombres a continuación) de la materia objeto de la reivindicación y para la cual se solicita una patente sobre el invento titulado

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METODO PARA EL TRATAMIENTO DE MERCADERIAS CON DIOXIDO DE CARBONO Y NITROGENO

METHOD OF TREATMENT OF GOODS WITH CARBON DIOXIDE AND NITROGEN

cuya descripción se anexa a la presente, salvo que se marque la siguiente casilla:

the specification of which is attached hereto unless the following box is checked.

☐ fue presentada el _____ bajo el número de solicitud de Estados Unidos o número de solicitud internacional PCT _____ y modificada el día _____ (de ser procedente).

☐ was filed on _____ as United States Application Number or PCT International Application Number _____ and was amended on _____ (if applicable).

Por este medio declaro que he revisado y que entiendo el contenido de la descripción que antecede, incluso las reivindicaciones, según están modificadas de acuerdo con cualquier modificación arriba citada.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

Por este medio reconozco mi deber de divulgar información que sea esencial con respecto a la patentabilidad según se define en el Título 37 del Código de Regulaciones Federales § 1.56.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

Spanish Language Declaration

PODER: Como inventor nombrado, por este medio designo al siguiente abogado o abogados y/o agente o agentes para que tramiten la presente solicitud y realicen todas las gestiones ante la Oficina de Patentes y Marcas Registradas en relación con la misma: *(Indique el nombre y número de registro)*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: *(list name and registration number)*.

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